

L. L. NARAYANA* & Digamber RAO*: **Contributions
to the floral anatomy of Linaceae 8****

L. L. ナラヤナ*・D. ラオ*: アマ科の花部解剖学的研究 8

Earlier publications on the floral anatomy of this family were those by Narayana (1964); Narayana and Rao (1966, 1969, 1971, 1973, 1974a, b, 1976a, b). The present paper, the eighth in the series deals with the floral morphology and anatomy of two species of *Hesperolinon*, viz., *H. alatum* (Small) Winkler and *H. micranthum* A. Gray.

Morphology of the flower

The flowers are pedicellate, pentacyclic, pentamerous, heterochlamydeous, regular, bisexual and hypogynous (Figs. 1, 14, 16, 18, 33). The calyx is gamosepalous and the free limbs show quincuncial aestivation (Figs. 11, 12, 14, 16, 32, 33). In the sepals of *H. alatum* the inner epidermal and hypodermal layers are thick-walled (Figs. 1, 2, 11, 12, 14, 16). The free petals show contorted aestivation (Figs. 16, 33) and are provided with cushion-shaped glands laterally and along the midrib region on their inner sides (Figs. 1, 3-5, 18-22). These are restricted to the basal regions of the petals (Figs. 3-6, 18-22). In *Hesperolinon alatum* the androecium consists of five fertile stamens alternating with as many staminodes and are united into a tube at the base (Figs. 13, 14). There is adnation between the petals and the staminal tube at their base and they separate from the receptacle as a common structure (Figs. 13, 30). At a higher level the petals and staminal tube become free (Figs. 13, 14). In *Hesperolinon micranthum* there are only five fertile stamens which belong to the antisepalous whorl and the antipetalous stamens are suppressed (Figs. 31, 32). Petals and stamens separate as a tube and at a higher level split into five petals and five stamens (Figs. 30, 31). At a slightly higher level the glands of the petals which are free above, alternate with the fertile stamens giving the impression that they are staminodes of the antipetalous whorl (Figs. 32, 33). The ovary is 5-carpellary in *H. alatum* (Figs. 13-15) and tricarpeal in *H. micranthum* (Figs. 31-34). The loculi

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** Continued from Journ. Jap. Bot. 51: 349-352 (1976).

are double the number of carpels at the base of the ovary (Figs. 13, 14, 31); the ovary becomes unilocular at the top (Fig. 16). The styles in *H. micranthum* are connate at the base for a short distance (Fig. 18), while in *H. alatum* there is a single style with a stylar canal lined by transmitting tissue (Figs. 1, 17). The capitate stigmatic lobes bear glandular hairs (Figs. 1, 18).

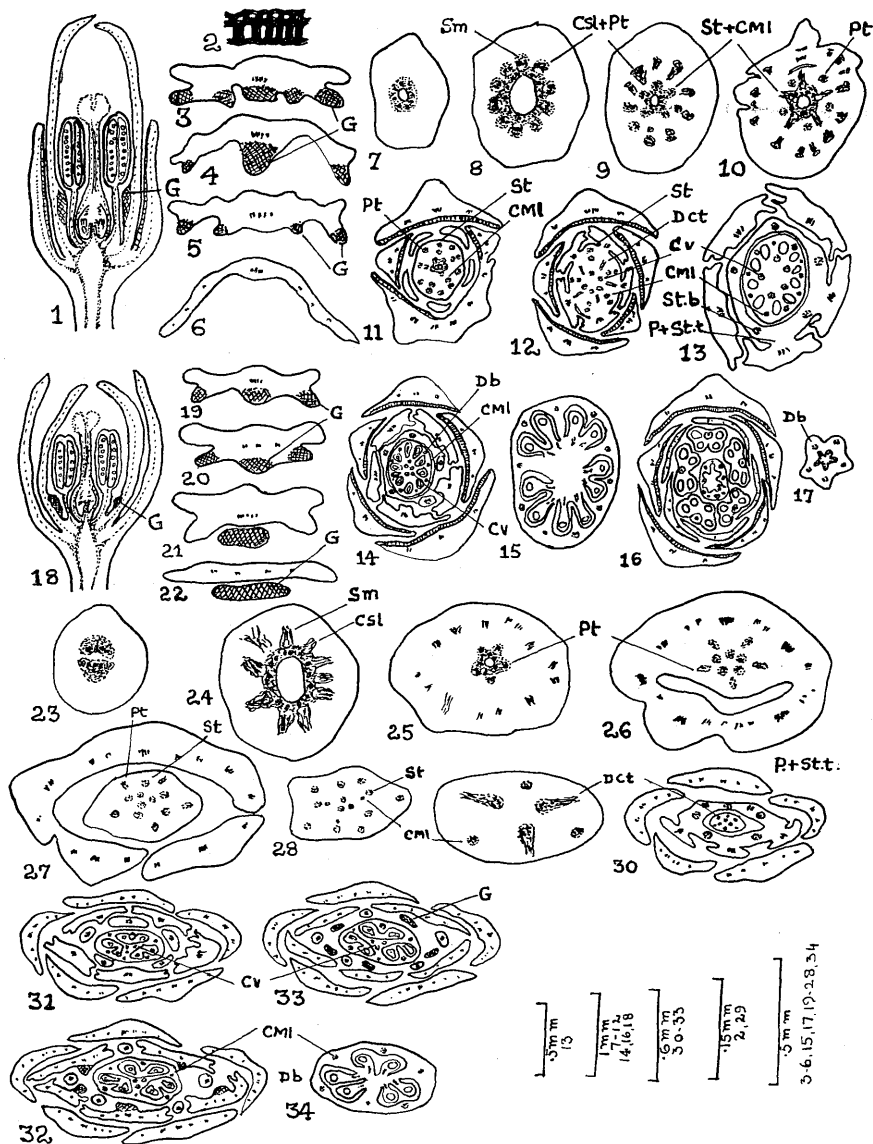
Floral anatomy

The stele in the pedicel of *H. alatum* is surrounded by a band of sclerenchyma (Figs. 7, 8). In *H. micranthum* there are two bands of arch-shaped vascular tissue (Fig. 23) which unite to form a closed ring in the receptacle. In *Hesperolinon micranthum* the sepal midrib traces and the conjoint sepal lateral traces arise in a whorl (Fig. 24). The petal traces arise independently (Fig. 25). In *H. alatum* the common sepal lateral traces and the petal midribs arise conjointly (Figs. 8, 9).

After the perianth supply is given off, five staminal traces arise from the main stele (Figs. 9, 27). The petal and staminal traces enter the tube formed by their union (Figs. 13, 30). In *H. alatum* the staminal traces before they enter the petal staminal tube, divide tangentially demarcating the common median lateral traces of the carpels (Figs. 11, 12). In *H. micranthum* three out of the five staminal traces undergo tangential division to demarcate the three common median laterals of the carpels on the inside (Fig. 28). In both, these bundles fade away as they reach the top of the ovary. After the demarcation of the common median lateral bundles the petal-stamen tube separates from the receptacle (Figs. 13, 30). Five dorsal carpellary traces in *Hesperolinon alatum* and three in *H. micranthum* arise from the main stele (Figs. 12, 29). The remaining stele forms inversely oriented common ventral bundles in these two species (Figs. 13, 14, 30-33). In the placental region the common ventral bundles (Figs. 14, 33) split into two each and supply the ovules in adjacent loculi (Figs. 15, 34). The dorsal bundles extend into the style or its branches and finally reach the base of the stigmatic lobes (Figs. 1, 17, 18).

Summary and conclusions

The flower is pentacyclic in *Hesperolinon alatum* and tetracyclic in *H. micranthum*. The gamosepalous, quincuncial sepals are three-traced. While there is connation between the lateral traces of adjacent sepals in *H. mi-*



cranthum, the sepal lateral traces show adnation with the petal traces in *H. alatum*. The free, contorted petals are single traced with glandular outgrowths at the base on the inner side. The stamens are single traced. There is basal adnation between the petals and staminal tube. While the androecium in *H. alatum* shows five antipetalous, non-vascularised staminodes; they are completely suppressed in *H. micranthum*. The carpels are 5-traced and the ovary is 5-carpellary in *H. alatum* and 3-carpellary in *H. micranthum*. Both species show adnation between the staminal traces and the common median lateral traces. The placentation is anatomically parietal.

Acknowledgements

We are thankful to Dr. J. J. Wurdack, Smithsonian Institute for kindly sending the materials for the present study. Our grateful thanks are due to Dr. K. Subramanyam for helpful criticism and to Prof. U. B. S. Swami for his interest.

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本報では *Hesperolinon* 属の2種を扱った。*H. alatum* は5輪生でおしべ5個と仮おしべ5個を持つが *H. micranthum* では4輪生でおしべは5本あるだけである。また前者はめしべ5個、後者は3個を持つ点を異にするだけで他属とその管束走向については大差はないことがわかった。

Figs. 1-17. *Hesperolinon alatum*. 18-34. *H. micranthum*. 1, 18. Diagrammatic and semidiagrammatic longitudinal sections of flowers showing the course of vascular bundles in the different floral parts. 2. Portion of the inner surface of the sepal in T.S. showing thick-walled epidermal and hypodermal layers. 3-5, 19-22. Petals in sectional view to show the cushion-like glands on their inner side. 6. Petal at a higher level. Note absence of glands. 7-17, 23-34. Serial transverse sections of flower buds showing the origin and distribution of vascular traces to the different floral parts. For explanation see text. Abbreviations. Sm: Sepal midribs. Csl+Pt: Common sepal laterals+petal traces. Pt: Petal traces. St+CMI: Stamen+common median lateral traces. St: Staminal trace. CMI: Common median laterals. St. b: Staminal bundles. P+St. t: Petal+staminal tube. Dct: Dorsal carpellary traces. Db: Dorsal bundles. Cv: Common ventrals. G: Gland.